

1. A method for producing a line of laser light on a surface, comprising:

positioning a laser diode, of the type that produces an oblong beam diverging unequally in wide and narrow angles of divergence along two perpendicular axes, a long axis and a short axis, at a position spaced away from a surface on which a reference line is to be projected, and

focusing the laser beam to converge the beam in the narrow angle of divergence on said short axis, to bring the beam into approximate focus along a line on said surface,

whereby the wide angle of divergence of the laser diode's beam in the long axis is used to generate a line on the surface, in a simple and efficient optical system.

2. The method of claim 1, wherein the step of positioning the laser diode includes tilting the aim of the laser diode obliquely downwardly toward the surface.

3. The method of claim 1, wherein the focusing step comprises placing a converging lens in the path of the laser diode's beam and tilting the converging lens so as to be closer to the laser diode at a lens end more distant from the surface, and farther from the laser diode at an opposite lens end closer

to the surface, to a lens orientation to maximize the focus of the laser beam along the line, in portions of the line both near the laser diode and distant from the laser diode.

5           4. The method of claim 1, wherein the laser diode is positioned about 25 to 125mm away from the surface.

5. A method for projecting a level or plumb line on a wall, comprising:

10           providing an instrument having a housing with a base side and having an exit window for a laser beam, a laser diode in the housing producing a laser beam, optics in the path of the beam to generate a generally fan-shaped output beam oriented such that a plane essentially including the fan-shaped beam is generally  
15           perpendicular to the housing base side, and single-axis self-leveling means in the housing for compensating for small tilt angles of the housing within a plane of the wall surface as the housing is positioned with the base side against a wall to thus correct the output beam to substantially level or plumb, and

20           placing the base side of the instrument against a wall surface with the housing approximately but not precisely level in the plane of the wall surface and projecting an output beam to form a line on the wall surface without self-leveling the beam in a vertical plane perpendicular to the wall surface, the

instrument serving to self-level the output beam to substantially level or plumb orientation in the plane of the wall surface,

whereby the instrument as used against a wall provides an accurate level or plumb line on the wall with only one axis of self-leveling.

6. The method of claim 5, including producing both level and plumb lines on the wall surface using the instrument.

7. The method of claim 5, including projecting two 180°-opposed substantially plumb lines on the wall surface and one substantially level line on the wall surface using the instrument.

8. A method for producing a line of laser light on a wall surface and highlighting the position of a wall stud, comprising:

providing a laser instrument that includes a laser diode and optics receiving light from the laser diode and producing a fan-shaped beam of light from the instrument, oriented such that a plane in which the fan-shaped beam generally is positioned is generally perpendicular to a base of the instrument, the base being adapted to engage against a wall surface,

a stud finder attached to the laser instrument, in a position such that the fan of light produced by the instrument is

aligned with an indicator on the stud finder showing the location of a wall stud, and

placing the instrument and attached stud finder against a substantially vertical wall, moving the instrument and stud finder to locate a wall stud inside the wall, and, with the instrument projecting the fan-shaped beam substantially vertically, indicating with a line produced by the beam a protracted length of the stud in the wall.

9. The method of claim 8, wherein the laser instrument includes self-leveling means for projecting a substantially truly plumb fan-shaped beam even when the instrument is not oriented truly level or plumb, so that the instrument can be placed in only approximately level orientation on the wall to project the beam substantially vertically.

10. A laser instrument for producing a line on a wall surface, comprising:

a housing having a base side and having an exit window for a laser beam,

a laser diode in the housing producing a laser beam, and optics in the path of the beam to generate a generally fan-shaped output beam oriented such that a plane essentially including the fan-shaped beam is generally perpendicular to the housing base

side such that the output beam produces a line on a surface on which the base side is placed, and

single-axis self-leveling means in the housing for compensating for small tilt angles of the housing as the housing is positioned with the base side against a wall to thus correct the output beam to substantially level or plumb, said small tilt angles being due to slight rotation of the housing from truly level or plumb in the plane of the wall surface, the instrument being without self-leveling tilt compensation in a plane perpendicular to the wall surface,

whereby with the base side of the instrument against the wall surface the instrument is sufficiently close to level and plumb in a vertical plane perpendicular to the wall surface, and the single-axis self-leveling means substantially corrects for any tilt of the instrument in the plane of the wall surface.

11. The instrument of claim 10, wherein the laser output beam is positioned about 25mm - 125mm from the base side of the housing.

12. The instrument of claim 10, in combination with a stud finder attached to the instrument's housing, the stud finder having an indicator to show the location of a wall stud in a wall, whereby the instrument with the stud finder can be placed

on the wall at the location of a stud and a plumb or level line can be projected onto the wall surface.

13. The instrument of claim 12, wherein the instrument is positioned relative to the stud finder such that said plane essentially including the fan-shaped beam substantially includes the indicator on the stud finder, and wherein the instrument projects a plumb output beam, whereby the instrument can be used on a vertical stud wall to locate a projected length of a wall stud.

14. The instrument of claim 12, including a bracket attaching the instrument's housing to the stud finder.

15. A laser instrument for producing a line on a wall surface comprising:

a housing having a base side and having an exit window for a laser beam,

a laser diode in the housing producing a laser beam, and optics in the path of the beam to generate a generally fan-shaped output beam oriented such that a plane essentially including the fan-shaped beam is generally perpendicular to the housing base side such that the output beam produces a line on a surface on which the base side is placed, and

leveling means in the housing for orienting the housing substantially level or plumb in the plane of the wall when the housing is placed against the wall surface, so that the output beam is substantially level or plumb, and

5        a stud finder attached to the instrument's housing, the stud finder having an indicator to show the location of a wall stud in a wall.

10        16. The instrument of claim 15, wherein the instrument is positioned relative to the stud finder such that said plane essentially including the fan-shaped beam substantially includes the indicator on the stud finder, and wherein the instrument projects a plumb output beam, whereby the instrument can be used on a vertical stud wall to locate a projected length of a wall  
15        stud.

17. The instrument of claim 15, wherein the leveling means comprises a vertical-indicating level vial on the housing, oriented so as to allow adjustment of the instrument to produce a  
20        vertical line of light when the instrument is used with its base side flat against a substantially vertical surface.

18. The instrument of claim 17, wherein the housing further includes a horizontal-indicating level vial.